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BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE NEWS LETTER

VOLUME VI

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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR JULY 1939

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ADMINISTRATION

Adam Böving

Adam Böving, senior entomologist of the Division of Insect Identification and outstanding authority on coleopterous larvae, retired on July 31, 1939. Mr. Böving entered Government Service in 1913 as a specialist in coleopterous larvae in the Division of Forest Insects under A. D. Hopkins, after a distinguished career as a coleopterist in Denmark. Upon the formation of the Taxonomic Unit of the Bureau of Entomology (later reorganized as the Division of Insect Identification), Mr. Böving was transferred to that section, and there he remained in charge of the taxonomic work on coleopterous larvae until his retirement. He is the author or coauthor of 39 important papers on entomological subjects, 34 of which have been published during his connection with the Bureau. Most outstanding and best known of these is "A Synopsis of the Principal Larval Forms of the Order Coleoptera" (1931), written in collaboration with F. C. Craighead, in charge of the Division of Forest Insect Investigations. This work shows the larval relationships among the families of the order, gives keys to the families and many of the subfamilies, and is copious with original drawings made by the authors. It has been generally acclaimed by entomologists here and abroad as the most important single contribution in recent years to the taxonomy of Coleoptera. Mr. Böving's unusually broad training in Denmark, his interest in all branches of entomology, his unfailing courtesy, and his cordial cooperation with other entomologists have contributed to make him one of the most useful and best liked employees in the Bureau. Although retired, he will continue his scientific research, his immediate objective being a study of the larvae of the genus Phyllophaga.

FRUIT INSECT INVESTIGATIONS

Use of salt solution in bait-trap collections.--Dwight F. Barnes, of the Fresno, Calif., laboratory, reports that, because of its preservative action, common salt is useful in making bait-trap collections. The fermented malt-sirup solution is poured from the traps through a strainer, the insects strained out being put into pint jars nearly filled with water. The material usually is looked over the next day. In hot weather the insects in the water ferment, soften, and give off disagreeable odors, adding to the difficulty of making determinations. Enough salt to make a saturated solution, added to the water in the jars as they are being filled preparatory to being taken to the field, reduces the trouble. The concentrated solution also aids by floating the insects when the contents of the jars is poured into enamel pans for examination.

Seasonal development of Catalina cherry moth correlated with that of its host.--S. M. Dohanian, in charge of the Eugene, Oreg., laboratory, has reported interesting observations on the seasonal development of the Catalina cherry moth (*Melissopus latiferreanus* Wals.). This insect is an important pest of filbert in the Northwest and also infests native hazelnut, oak acorns and galls, and other hosts. The wild hazelnut develops more rapidly during the summer than does the cultivated filbert and its nuts mature several weeks sooner. The emergence of moths from the material from infested hazelnuts reached its maximum 3 to 5 weeks ahead of that for moths emerging from infested filberts. On the latter host the emergence continued over a protracted period of time. The data relating to oak are not sufficiently complete to justify conclusions.

Addition of sugars to lead arsenate for codling moth control.--E. H. Siegler, in charge of the fruit-insect work at Beltsville, Md., has just submitted a note dealing with the addition of sugars on the effectiveness of lead arsenate in codling moth control. This work has been carried on in the laboratory by the use of the apple-plug method. The following table illustrates some of the preliminary results obtained.

Spray material and dosage	Pounds-gallons	Plugs	
		Total	Wormy
		Number	Percent
Check----------	---	214	95.6
Lead arsenate--	4-100	419	27.2
Lead arsenate-- Brown sugar----	4-100) 16-100)	420	11.0
Lead arsenate-- Sucrose--------	4-100) 16-100)	424	9.7

Other experiments have indicated that the addition of summer-oil emulsion at a strength of approximately 1 percent does not interfere with the influence of sugar on the effectiveness of lead arsenate. The experiments have also indicated that brown sugar is not toxic to the codling moth and that summer oil alone has comparatively little effectiveness when used in accordance with the technique followed at the Beltsville laboratory.

MEXICAN FRUITFLY CONTROL

Record July catch of fruitflies.--Although considerably less than half as many flies were trapped in the lower Rio Grande Valley in July as were taken in June, the month's catch was the highest on record for that period. These flies are the remnants of the high fly population present in the spring. Trap recoveries throughout the latter half of July, however, indicated that the population was rapidly decreasing and it is expected that flies will be exceedingly scarce during the latter part of the summer and early part of the fall. The new citrus crop is reported as being normal as regards maturity at this season of the year, with an estimated production approximating last season's 47,500 equivalent carloads.

CEREAL AND FORAGE INSECT INVESTIGATIONS

European corn borer parasites in Lake States at close of 1938.--W. G. Bradley, Toledo, Ohio, reports as follows on surveys conducted in October 1938 to determine the status of exotic and native parasites of the corn borer in selected districts in the Lake States infested area: "In these surveys 192 sample collections, comprising 13,541 larvae, were taken. This material, held in cold storage during the winter and reared in March and April, produced 3 species of exotic parasites. One of these, an ectophagous chalcid, *Eulophus viridulus* Thoms., appeared in 1938 on a maintenance basis for the first time. A total of 19 borers killed by this parasite were taken in 12 samples in the vicinity of the release point at Jerusalem Township, Lucas County, Ohio, the maximum distance from the release center at which the parasites were recovered being approximately 5 miles. No release had been made at this point since 1932. One colony was taken in close proximity to the release point in Erie Township, Monroe County, Mich., where releases of 20,081 adults were made in 1932. A colony was recovered in Danbury Township, Ottawa County, Ohio, at a point 8 miles from the nearest release center, 4 miles of this distance being across the water of Sandusky Bay. The most abundant parasite recovered was the tachinid *Lydella stabulans* var. *grisescens* R. D. This species showed a general increase in numbers over 1937 at all points examined in both years. In Perkins Township, Erie Co., Ohio, the parasitization within 1½ miles of the release center increased from 8.4 percent in 1937 to 38.1 percent in 1938, or an increase of about 350 percent. The parasitization of borers in several samples was over 50 percent. At a point in Jerusalem Township, Lucas County, surveyed by using the same type of polar coordinate as in previous years, an increase in parasitization was noted in all rings of the design as shown in the following table.

Distance from center	Parasitization in	
	1937	1938
	Percent	Percent
First ring[1]	23.1	24.6
First and second	19.3	23.5
First to third, incl	17.1	20.9
First to fourth, incl	12.2	15.1
First to fifth, incl	9.6	13.0

[1] Center circle is 1 mile in diameter; the inner three rings are each 1 mile wide; the outer two rings are each 2 miles wide.

The parasitization at this point in Jerusalem Township, within 3½ miles of the release point, has increased annually as follows:

Year	Parasitization
	Percent
1932--------------	0.2
1933--------------	2.8
1934--------------	6.3
1935--------------	7.6
1936--------------	10.0
1937--------------	17.1
1938--------------	20.9

The progressive increase in parasitization, together with the fact that the greatest increase occurred in the second and third rings indicated that *L. grisescens* had not reached equilibrium with its host, even within the 3½-mile radius of the release point. Some of the samples showed parasitization of over 80 percent, principally by *Lydella*. Collections made to determine the distribution of *L. grisescens* in the vicinity of marshland along the bays and inlets of Lake Erie and the Detroit River showed the tachinid to be present in varying densities from the Huron River east of Sandusky, Ohio, to the outskirts of Detroit, Mich., a distance of over 130 miles. Within this strip are several release points and the survey showed fairly uniform decrease in density of the parasite as the distance from the release points increased, indicating that dispersion was still taking place. The braconid *Chelonus annulipes* Wesm. was recovered in Adams Township, Lucas County, as a result of the releases made at this point in 1938. Three native parasites, viz., *Zenillia caesar* Ald., *Panzeria penitalis* Coq., and *Labrorychus prismaticus* Nort. were recovered in small numbers in the fall collection."

Effect of chloropicrin on germination of wheat.--J. C. Frankenfeld, Manhattan, Kans., reports that in tests conducted to evaluate the effect of various controllable factors affecting the germination of wheat when treated with chloropicrin, it was found that the percentage of germination after treatment with a given dosage, decreased as (1) the percentage of seed moisture increased; (2) the period of exposure increased; and (3) the temperature increased. Wheat containing from 10- to 12-percent moisture was practically uninjured with a dosage of 6 pounds of chloropicrin per 1,000 bushels when exposed to the fumigant for a period of 12 hours at a temperature of 95° F. With smaller dosages, the period of exposure can be extended proportionately. Wheat having a moisture content of from 14 to 16 percent, suffered considerable damage after an exposure of 6 hours. With dosages of from 1 to 3 pounds of chloropicrin per 1,000 bushels of wheat, practically no injury resulted to wheat containing from 10 to 12 percent moisture, even when the period of exposure was extended to 72 hours and the temperature raised to 120°. In wheat having from 14 to 16 percent moisture, and given the same treatment, the percentage of germination was greatly reduced after a 6-hour exposure. At a temperature of 50° wheats having moisture contents varying within the extreme limits previously mentioned, can be treated with safety at dosages of 1 to 6 pounds, for periods of exposure not exceeding 12 hours.

Flour-mill fumigation with mixture of methyl bromide and hydrocyanic acid.--R. T. Cotton and Geo. B. Wagner, Manhattan, Kans., report that a test was recently made to determine whether or not a 1-to-8 mixture of hydrocyanic acid and methyl bromide would be more efficient as a mill fumigant than either gas used alone. A 90-pound dosage of the mixture introduced into the milling machinery failed to give a complete kill, although conditions for the test were as nearly perfect as could be obtained. The kill of flour beetles obtained was somewhat better than that obtained with a dosage of 80 pounds of methyl bromide alone, but not so good as that obtained with a dosage of 50 pounds of liquid HCN used alone. No synergistic effect was noticeable as a result of combining the two fumigants.

The returned-bag menace.--Mr. Cotton also reports that the custom of using flour bags over and over again is one of the serious sources of insect infestation in flour mills. A recent survey of 102 mills that shipped about two-thirds of all baking flour used in the United States, has shown that 1 bag out of every 16 furnished by bakers to the flour mills for refilling with flour is entirely unfit for use, being either too weak or torn for repair, or too dirty for effective cleaning. An additional 1 out of 5 is not suitable as received but must be reconditioned by repairing or laundering, or both. Forty-four percent of all bakery-flour shipments went out last year in used bags. These empty used bags are stored in piles by the bakers until enough have accumulated to return for refilling. They contain enough flour to support the heavy infestations of insects present in them. These infested bags are usually stored without treatment on a floor of the mill or warehouse to which they have been returned, and where they serve as a potential source of infestation for the entire mill. Prior to refilling they are cleaned by some type of air suction; yet it is well known that such cleaning does not remove all stages of flour-infesting insects. The Oklahoma State Board of Health, recognizing the undesirability of using flour bags more than once, has recently issued an order prohibiting the sale of flour in used containers in Oklahoma and also prohibiting the use of flour, packed in such containers, in bakeries located in that State.

Weevil infestation in flour.--Mr. Cotton and T. F. Winburn state that, according to the Millers' National Federation, a number of flour jobbers in the South are urging millers to furnish guarantees that their flour is free of weevil infestation. Some dealers are asking for a warranty as to its condition at time of shipment and others are specifying that such guarantees should be good for 30 days or more after shipment. Even though flour were entirely insect free at the time of shipment, such a guarantee would be hazardous, owing to the possibility of the flour becoming infested while in transit. Many cars used for the shipment of flour have previously carried grain, and examination of such cars revealed the presence of many species of insects breeding in the accumulations of grain and grain dust in them. This was particularly true immediately after the heavy movement of grain at harvest time. Examinations made in July of a number of cars taken at random showed more than 90 percent to contain insects in accumulations of grain. Blowing with air, spraying with contact sprays, and fumigating with various gases are methods of attempted control employed by different railroads, but investigation of these practices indicated that, because of the construction of many of the cars, none of these methods gave perfect results at all times.

Lime, sand, and other dusts ineffective in control of insects in stored grain.--According to Messrs. Wagner and Winburn, Manhattan, recent tests with a number of dusts such as finely ground sand, wood ashes, lime, sulphur, soybean flour, and borax, indicate that, with the exception of the last-mentioned dust, these substances, when mixed with stored grain at the rate of 1 or 2 percent by weight, have no appreciable effect in preventing insect development unless the moisture content of the wheat is low. Borax has a decided protective action, but cannot be recommended, owing to the fact that it is absorbed by the grain.

Methyl bromide successful as fumigant for rice.--A. I. Balzer, Beaumont, Tex., reports that in the recent fumigation of a 365,500 cubic-foot warehouse containing 3½ million pounds of rice, a dosage of ¼ pound of methyl bromide per 1,000 cubic feet, or 0.25 ounce per 1,000 pounds of rice, gave a complete kill of insects with an exposure of 42 hours. The temperature was 87°F.

Hessian fly resistance of Dawson wheat bred through five backcrosses to susceptible varieties Poso and Big Club.--W. B. Noble, Sacramento, Calif., reports that in the program of breeding wheats resistant to the hessian fly in California, the hybrids Dawson (resistant) X Poso (susceptible) and Dawson (resistant) X Big Club (susceptible) were carried through five backcrosses to the susceptible parents, in order to eliminate certain agronomic characters of Dawson that were not wanted in the finished hybrid. Tests completed in 1939 on 313 BC^{5}F$_2$ families indicate that the fly resistance of Dawson was successfully transmitted through the five backcrosses.

BC^3 Dawson X Big Club shows promise in field trial.--Mr. Noble says that in 1937 selections were made from BC^3 Dawson X Big Club, and seed increased in 1938. In 1939 a composite of these selections was grown for field trial at Bird's Landing, Calif. This hybrid showed no fly infestation and noticeably outyielded nearby regular Big Club, which bore a plant infestation of 70 percent.

European corn borer in early market sweet corn.--A. M. Vance, Toledo, Ohio, submits the following tabulation showing the intensity of corn borer populations in early sweet corn grown for market in certain counties of Connecticut, New York, New Jersey, and Ohio. The survey in New Jersey was conducted by C.A. Clark, Moorestown, and data in New York were taken in cooperation with L. A. Carruth, of the Agricultural Experiment Station at Geneva, N. Y.

Infestation in 1939 was most severe in New Haven County, Conn., where half of the fields surveyed averaged 20 or more borers per plant and in Ulster County, N. Y., where the same proportion of the fields averaged 10 or more borers per plant. The most pronounced increase of the pest in sweet corn occurred in Burlington County, N. J., where the average number of borers in 1939 was 6 times that in 1938. Less than half as many borers infested the crop in Lucas County, Ohio, in 1939 as in 1938.

State and county	1939			Average borers per plant in 1938
	Fields surveyed	Dates of survey	Average borers per plant	
	Number		Number	Number
Connecticut:				
New Haven----------	25	July 15-19	19.8	8.8
New York:				
Ulster-------------	14	24-26	12.6	--
Albany-------------	17	24-29	7.5	6.2
Columbia-----------	17	20-27	5.4	4.0
New Jersey:				
Burlington---------	29	5-11	4.2	.5
Ohio:				
Lucas--------------	25	Aug. 1-5	8.2	17.5

JAPANESE BEETLE CONTROL

Airport-inspection service.--Two inspectors were stationed at the Newark, N. J., municipal airport the middle of July. One worked from 9 a.m. to 6 p.m., the other from 11:30 a.m. to 7:30 p.m. The inspectors worked with the employees of the various transport lines in ridding both passengers and planes of Japanese beetles before the ships embark. The first plane infestation was found on July 12 when 1 beetle was taken from the baggage compartment of a plane bound for Chicago. It was almost a daily occurrence during the remainder of the month for from 1 to several beetles to be removed from the baggage compartments, cabins, or the passengers themselves. Over 30 active beetles were prevented from obtaining free air transport to such points as Los Angeles, Calif., Miami, Fla., Chicago, Ill., Kansas City, Mo., and Fort Worth, Tex. In some controlled tests, live beetles were placed in cages, some with foliage and others without, and carried in airplanes on regular passenger routes between Newark and Pittsburgh, both points within the infested zone. Altitudes during the flights ranged from 2,000 to 8,000 feet, and the speed of the planes from 165 to 180 miles per hour. The cages contained from 66 to 95 beetles each. In only 3 of the 6 flights involved were any beetles found dead upon arrival at Pittsburgh, and in no instance did more than 4 beetles succumb. Presence or absence of food on these short flights was found to have no appreciable effect on beetle survival.

Activities on the Eastern Shore.--Activities in connection with the summer quarantine on fruits and vegetables were quite heavy on the Eastern Shore of Maryland and Virginia and in Delaware during the month, although the work was considerably under the same period of last year. This was due to a decrease in the methyl bromide fumigation of loaded refrigerator cars caused by a reduction in the potato crop as a result of dry weather. Packers and shippers cooperated in keeping their packing sheds beetle-proof. Daily checks were made to see that screens were in place and the houses free from beetles. An inspector checking trucks crossing the Cape Charles-Norfolk ferry reported an increase in southbound truck traffic late in the month. All drivers with uncertified material intended for movement outside the regulated area were informed of the inspection regulations. Inspectors of farm products, when not busy with actual inspection work, scouted around the loading points and located many new infestations. Presence of adult beetles at these points was attributed to the cleaning of trucks returned from the heavily infested area. As many as 25 live beetles were picked from the screens of trucks arriving from sections where beetles were swarming.

Beetle conditions in Philadelphia.--Small numbers of flying beetles were seen along the Philadelphia water front from July 15 to 20. Although the infestation was comparatively light, beetles were found in all parks and market places in the city. The largest infestations in the central portion of the city were located at the Port Richmond freight yard and Christ Church cemetery. Beetles were also present in the produce terminal yards in South Philadelphia, and numbers were found feeding on flowers in West Philadelphia. In suburban Philadelphia the beetles are about as numerous as last year. With the exception of several establishments in the southern portion of Chester County, Pa., which reported heavy infestations, the classified establishments in that section report the infestation to be about average or lighter than last season. Orchardists in the Philadelphia area who followed recommended spray schedules reported a minimum of injury to their fruit by the beetle. Severe damage to corn in the region east of Lancaster County was reported. The leaves, as well as the silk and tassels, were attacked and the unusual amount of leaf feeding caused the leaves to curl and dry.

Farm products inspection in New England.--At Portland, Maine, four Japanese beetles were removed from beans inspected and certified for shipment via truck to nonregulated points in Maine. During inspections at the Boston market, nine beetles were removed from beans from New Jersey, Maryland, and Connecticut and from blueberries and raspberries from New Jersey. While inspecting farm products for Japanese beetle infestation at a chain store warehouse at Somerville, Mass., inspectors found two gypsy moth larvae and one gypsy moth pupa in a shipment of two boxes of locally grown beans consigned to Caribou, Maine, a point outside the gypsy moth infested area. At the wholesale produce market in Portland, Maine, an inspector removed one gypsy moth larva from a box of beans destined to Camden, Maine. At the Quincy Market in Boston truckloads of potatoes and cucumbers from Delaware and Maryland were found to be bringing numerous Japanese beetles from these areas. The first shipment of Maine sweet corn at the Portland market was noted on July 31. This came from Gorham, Maine, and was found to be quite heavily infested with the European corn borer.

Japanese beetle control activities in New York City.--While there was an indication of increased infestation in the New York City area there was a decided decrease in the active flight, as compared to last season. After the finding of an infestation on a previously uninfested nursery establishment in Suffolk County, Long Island, the owner constructed a methyl bromide fumigation chamber for the fumigation of potted strawberry plants. Another important item in the certification of nursery stock on Long Island was the initial application during July of lead arsenate to 30,351 square feet of nursery area. A survey was started in July to determine general conditions of infestation in the New York City area.

Drought affected New Jersey quarantine activities.--Inspections during the month of July in New Jersey proved to be the lowest for several years. A 50-percent reduction in crop yields was reflected in the certification of approximately 23,000 units of farm products, as compared with nearly 76,000 units in July 1938. Potatoes were slow in moving because they were either too green to dig or the growers were holding them for better prices. Blueberry growers reported from one-third to one-half of a crop. The tendency of southern truckers to pick up pay loads of New Jersey potatoes on their return trips also required additional work in contacting some 300 growers whose crops have previously moved by rail. With quarantine activities in the State reduced, State-paid inspectors cooperated with the nematode laboratory in making contacts and arranging for the future general distribution of nematodes on a large scale for control of Japanese beetle larvae in the soil.

Inspections in Virginia.--It was necessary to employ an additional farm-products inspector at the Fredericksburg, Va., platform in order to handle the numerous truckloads of produce that reported at that station before proceeding to southern points. Quantities of Japanese beetles were removed from empty refrigerator cars upon their arrival by ferry at Little Creek, Va., from Cape Charles. The latter part of the month quite a few truck drivers who had been warned at Cape Charles against transporting uncertified produce to nonregulated area applied for inspection at the inspection platform in Norfolk. Also during the month nine truckloads of produce that had been intercepted at the road stations or by mobile inspectors returned to Norfolk for inspection. Eight beetles were removed from string beans examined at Richmond during the month. Nursery and greenhouse scouting in the Richmond area was completed late in July.

Japanese beetle control by rose growers.--Approximately $2,000 has been spent each year for the last several years by one of the large rose-growing firms at West Grove, Pa., in an effort to keep the Japanese beetles from damaging their rose plants. Some 2,200 pounds of lead arsenate was used by this establishment in spraying their roses this summer. This was effective in keeping their plants in good condition despite a dense beetle infestation in the neighborhood. Another large grower in the same area has re-treated 3,987 square feet of soil with lead arsenate and has newly treated an additional 10,000 square feet for use in plunging potted plants next spring. Heavy defoliation of shade trees and shrubs was observed in some sections of the West Grove area.

Japanese beetle survey in newly regulated area.--With the inclusion in the regulated area of the city of Rochester and the town of Brighton, Monroe County, N. Y., under a modification of the regulated area effective July 1, 1939, an inspector was stationed in Rochester to contact nursery and greenhouse establishments. The quarantine regulations were explained and certificates were issued as necessary. In this area 42 nurseries and greenhouses and 1 soil establishment were classified. Several of these are actually located outside the regulated area, but use Rochester as their shipping and receiving center. An additional 64 establishments contacted claimed to have no need for classification.

Heavy beetle flight in Baltimore.--Beetle flight in Baltimore this year was the heaviest yet experienced in that city. Swarms were present from July 1 until about the 20th, after which they rapidly diminished. A covered conveyor system for loading bananas from boats into refrigerator cars was placed in operation at the fruit piers, but the beetle flight was so heavy that many bunches were rejected because of beetles crawling down into the bunches. Inspectors collected thousands of beetles daily at the railroad cleaning yards and at fumigation points.

Heavy build-up in beetle population in southern New England regulated area.--Nursery and greenhouse scouting in the New England States, begun in Connecticut on July 10 and in the other States on July 17, indicates a heavy increase in beetle population, particularly in Connecticut, where by the end of the month 11 classified establishments and 19 potting-soil and manure sources had been found infested. In Massachusetts beetles were found on 4 classified premises. Two sources from which classified establishments obtain potting soil were found infested in Rhode Island. A heavy invasion of the beetle in Hartford, Conn., was reported on July 10.

Japanese beetle trapping.--During July trapping was discontinued in 4 cities in Georgia, 3 in Kentucky, 4 in North Carolina, 6 in Ohio, 1 in South Carolina, 22 in Virginia, and 5 in West Virginia. First-record infestations, mostly of a few beetles each, were recorded in 2 cities in Indiana, 1 in Michigan, 6 in Ohio, 2 in Pennsylvania, 3 in Virginia, and 9 in West Virginia.

Beetles invade boardwalk.--Vacationers at Ocean Grove, N. J., reported that on July 15 a heavy flight of the beetle occurred at that resort. On the following day a flotation of dead beetles annoyed bathers at Seaside Heights, farther south on the Jersey coast.

Municipal Japanese beetle trapping.--By the end of July approximately 200,000 Japanese beetles had been trapped in 1,600 traps set by the Park Department in the city of Springfield, Mass. A report from the Rhode Island authorities states that at the end of the month over 1,500,000 beetles had been trapped in Providence and adjoining sections.

Gypsy moth egg masses reappear in inspected material.--In the quantities of quarantined products inspected and certified during the month, various stages of gypsy moth infestation were found in 9 lots. The first newly laid egg masses to be removed from an inspected shipment were taken from 4 truckloads of lumber moving from New Salem, Mass., to Avon, Conn. Eight egg clusters, 50 larvae, and 3 pupae were creosoted and removed from the lumber in this shipment. Forty-eight larvae were removed from a less-than-carload shipment of contractor's materials loaded at Hyannis, Mass., for freight movement to Baltimore, Md. A carload of lumber inspected at Deering Junction, Maine, prior to shipment to Buffalo, N. Y., was found to be infested with 25 larvae and 5 pupae. Nine larvae and 3 pupae were removed from 2 shipments of wooden trellises shipped by a fireworks company at Canton, Mass., to Hackettstown, N. J., and Barton, Vt., respectively. Infestations removed from shipments prior to certification totaled 146 larvae, 16 pupae, and 8 egg clusters.

Pupation and oviposition delayed.--Initial observations of gypsy moth pupation and egg laying this year indicate that these stages are about 2 weeks later than usual. This is attributed to the cold weather in May and early in June, which retarded the hatching of egg clusters and the growth of larvae. The first pupae reported were at Chelmsford, Mass., on July 10 and at Alfred, Maine, on July 18. On the latter date oviposition was quite heavy at Holyoke, Mass. Also on July 18 the first egg clusters were observed at Cape Cod and Chelmsford, Mass.

Defoliation by gypsy moth.--Defoliation was observed by the district inspector at Keene, N. H., in the towns of Charlestown, Swanzey, Winchester, and Westmoreland, N. H., and in Rutney, Rockingham, and Springfield, Vt. Heavy feeding with considerable defoliation was reported in towns along the Maine and New Hampshire coast from Salisbury, Mass., to Kennebunk, Maine. Defoliation by brown-tail moths was also observed in some of these coastal towns.

First-record Dutch elm disease confirmations.--*Ceratostomella ulmi* was cultured from a beetle gallery found in one of the logs from a beetle trap placed in Wilton, Conn., some distance from any known infection. First-record confirmations were reported during the month in the towns of Shelton and Trumbull, Fairfield County, Conn. In Dutchess County, N. Y., confirmations were recorded in the towns of Amenia, Dover, Red Hook, and Rhinebeck. Other New York first records were determined in the towns of Hope and Montgomery, in Orange County, and the towns of Lloyd, Marlborough, New Paltz, and Plattkill, in Ulster County. The Montgomery town confirmation extends the infection zone to within a mile of the Ulster County line. First records reported in Pennsylvania occurred in the townships of Doylestown, Durham, Middletown, and Northampton, in Bucks County, and the borough of Hellertown, in Northampton County. Discovery of infection on Minisink Island in Sussex County, N. J., extends the border of the infection zone in the northwestern corner of New Jersey to the middle of the Delaware River. Scouts turned up a diseased tree in Hockingport, Athens County, Ohio.

Drought hampers Dutch elm disease scouting.--Exceptionally clear, dry weather during most of July had a retarding effect on the field scouting. Wilting resulting from the dry weather produced innumerable flags that caused the scouts to do an excessive amount of climbing and sampling. Japanese beetles and elm leaf beetles fed heavily on the elm foliage and in some sections completely defoliated the trees, thus adding to the difficulties of scouting. Due to the hazardous fire conditions prevailing, orders were sent out to use extreme caution in burning. Only confirmed trees and beetle-infested material were burned and these were removed to gravel pits and other safe places before they were destroyed.

Temporary lay-off of W. P. A. workers.--In the absence of a definite allotment of emergency relief funds, all security-wage workers were terminated on June 30 until further notice. Per diem scouts and appointed personnel continued their activities straight through the month. W. P. A. workers were recalled in New Jersey on July 10. Work was not resumed by the W. P. A. force in New York until July 14 and 15, and the men in Connecticut did not report back until July 19. At the end of the month there were 3,369 W. P. A. workers on the rolls, along with 1,620 per diem employees, 68 appointed men, 121 appointees on W. P. A. rolls, and 61 cooperative employees on State pay rolls.

Isolated infection.--Confirmation was received on July 29 of a diseased elm in the township of Fenton, south of the village of Harpursville, Broome County, N. Y. This tree was located by one of the crews engaged in perimeter scouting in the circular strip between the 100- and 150-mile radii from the infection center. This constituted another isolated infection remote from the main infected area.

Progress in Dutch elm disease scouting in Indiana.--Systematic scouting on the first go-over was completed in the Indiana area in July. A second go-over was under way in most of the area in Marion, Hamilton, and Hancock Counties by the end of the month. Six confirmations were reported from the Indianapolis area in July.

Dutch elm disease infection decreased in Essex County, N. J.--There was a definite improvement in the Essex County, N. J., infection. There were 475 twig samples collected for culturing this year up to the middle of July, as compared to a total of 1,019 during the same period in 1938.

FOREST INSECT INVESTIGATIONS

Observations on European spruce sawfly.--P. B. Dowden and W. F. Sellers, of the New Haven, Conn., laboratory, report as follows: "At Marlboro, in southern Vermont, there was a tremendous population of first-generation larvae, which severely defoliated the lower two-thirds of most trees over a wide area. Mortality was light until crowding caused great numbers to fall from the trees. Many of these became weakened and died before they could complete feeding; nevertheless, large numbers formed cocoons. Larvae were counted as they attempted to climb 1 tangle-footed tree. Between June 22 and July 22 about 80,000 were removed. The first new-generation cocoons were observed on July 4 and by July 15 most of the healthy larvae had spun up. The first new-generation adults were observed on July 20. Feeding experiments indicated that first- and fourth-instar larvae could not complete development on 1939 foliage. At the Dublin plot in southern New Hampshire there was also a tremendous larval population with severe defoliation of old foliage. Large masses of larvae congregated at the bases of many trees at this plot. Most of the larvae in these masses died before spinning cocoons. The 4 observation points at Lincoln, in central Vermont, were visited on July 13. At each of these points the sawfly infestation has been greatly reduced. A few dead trees were noted but most trees appear to be in much better condition than in 1938. On July 21 the plot in Township 12, Range 16, in northwestern Maine, was visited. Larval development has been very slow in this area and apparently only 1 full generation will develop this year. Of 100 larvae beaten from the foliage, about 70 percent were in the first and second instars, while only 1 full-grown larva was obtained. Several points were visited late in July in Pittsburg, northern New Hampshire, where the spruce sawfly was observed in small numbers in 1938. The infestation appeared about the same as last year, but most of the larvae were still in the first and second instars."

Forest tent caterpillar in Massachusetts and Vermont.--J. V. Schaffner, Jr., New Haven, reports that in Massachusetts severe infestations of the forest tent caterpillar occurred through the northern half of Berkshire County, especially between Lenox and Williamstown, where thousands of acres of forest growth were from 50 to 75 percent defoliated. Although very few areas were observed where the trees were completely stripped of foliage, the infestation throughout this region was much more extensive than in 1938. In Vermont, in the counties of Bennington, Rutland, Addison, Orange, Windsor, and Windham, where outbreaks have occurred during the last 4 or 5 years, the infestation this year was spotty and generally lighter. Many hundreds of acres of sugar maple orchards and hardwood forests were observed that were from 25 to 50 percent defoliated, but only a few small scattered areas were noted where the average defoliation exceeded 50 percent. One area, however, of 75 to 100 acres on a hillside west of Pawlet Village in Rutland County, was 75 to 100 percent defoliated.

European earwig in Northeast.--Mr. Schaffner also reports that in New Haven, where a few earwigs had been collected in 1938 by the late W. E. Britton, traps were put out to obtain some data on the abundance of the insect. The first examination of the traps was made on July 24 and 156 specimens were obtained.

Young pine injured by tip moth and Matsucoccus scale in New Jersey.--T. J. Parr, New Haven, reports: "Mixed plantations of shortleaf, ponderosa, and red pine on the Belleplain State Forest, New Jersey, were found to be heavily infested with the Nantucket pine tip moth (Rhyacionia frustrana Comst.). This was especially true of the shortleaf pines, which had much of the current growth affected. These insects were in the pupal stage. The pitch pine in both the East and West Plains areas of the pine barrens are extremely heavily infested with the same insect, practically every tip of the current growth being killed back. The insects had already matured in these areas and only a few pupae, apparently parasitized, were collected. If the infested trees are allowed to grow to the point where the stand closes, it appears that there is little further injury from this insect. Matsucoccus gallicolus Morrison was found present on pitch pine generally throughout the whole area. The East Plains area in particular had been heavily infested prior to the last fire, which probably occurred about 6 or 9 years ago, but the present growth is uninfested. The West Plains area examined had also been infested prior to the fires of 1932 and 1936 but not, apparently, as heavily as was the infestation in the East Plains. The West Plains is at present free from the insect, but it appears that it will be only a matter of time before reinfestation from adjoining areas will occur. Apparently, Matsucoccus has in the past been a factor in keeping the pine growth on these plains areas in a stunted condition, as the Nantucket pine tip moth is doing at present."

Developmental period for elm bark beetles.--C. H. Hoffmann, of the Morristown, N. J., laboratory, has been felling elm trees at intervals of 2 weeks to obtain data on the life histories of Scolytus multistriatus Marsh. and Hylurgopinus rufipes (Eich.). A tree cut on April 28 and sectioned on May 15 produced large numbers of H. rufipes beginning July 25, indicating that the total developmental period extended from 71 to 88 days if the extremes of the exposure dates are considered. The total development of *S. multistriatus* in a tree cut on May 15 and exposed until May 31 required from 52 to 63 days, while complete development was noted as 38 to 54 days in a tree cut on May 31 and exposed until June 16.

Latent Dutch elm disease infection contaminates elm beetle.--W. D. Buchanan reports the isolation of *Ceratostomella ulmi* (Schwarz) Buisman from 3 of 247 adults of *Scolytus multistriatus* Marsh. taken while they were feeding in twig crotches of nursery elms inoculated with *C. ulmi* in 1938. The beetles were reared from wood known to be free of the fungus. None of the nursery trees were showing wilt symptoms at the time the beetles were removed from the crotches. The fact that beetles can become contaminated with the fungus by feeding on a tree having a latent infection indicates the danger of such trees in an eradication program.

Forest-insect surveys in Northwest.--The entire ponderosa pine region of Oregon and Washington will again be covered by a cooperative survey directed by the Portland, Oreg., laboratory. After a 10-day training period on the Deschutes National Forest, the 12 men employed for the intensive check-plot surveys were divided into 4 parties. Of 170 permanent survey plots the first ones were cruised on July 20. By starting in the lightly infested units and progressing to the heavily infested units, a more complete record of the 1939 loss will be obtained on the most important areas.

Mormon crickets become forest pests.--On the dry lower foothills of the south slope of the Wallowa Mountains, northeast of Halfway, Oreg., a band of Mormon crickets, which according to Supervisor Moncrief covered an area of about 10,000 acres in 1937, extended to more than 125,000 acres in 1939, 50,000 acres being within the boundary of the Whitman National Forest. W. J. Buckhorn, Portland, Oreg. reports that several devastating migrations developed during the spring and early part of the summer. Some of these traveled through forested areas and consumed virtually all green vegetation in their path. The more favored grasses vanished first; next low shrubs were stripped; and then, in areas along the edge of the forest, ponderosa pine reproduction up to 10 or 15 feet in height was defoliated in varying degrees. Some trees were completely stripped, and part of the new-leader growth on twigs and branches was consumed. No doubt this will result in the death of many young trees.

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Spraying season reasonably successful despite shortages.--More than 11,000 woodland acres were sprayed for the gypsy moth during June in Vermont, Massachusetts, Connecticut, and Pennsylvania. In addition to the woodland, a large number of residential properties and individual trees were also sprayed. This Bureau also cooperated with the Canadian Department of Agriculture in spraying infested areas in Maine and New Brunswick. The Canadian authorities provided the spraying equipment and crew, while this Bureau furnished the lead arsenate and fish oil used in spraying gypsy moth infestations in the residential sections of Calais and Milltown, Maine. A regular employee of this project supervised the spraying in the Calais area and also directed the spraying operations in St. Stephen, just across the national boundary in the Province of New Brunswick. This work was completed in approximately 1 week.

Many duties performed by regular gypsy moth field force during the temporary suspension of work by the W. P. A.--The termination of the services of all W. P. A. personnel on June 30 for an indefinite period necessitated the immediate detailing of a large number of the regular gypsy moth field force to various types of work that would ordinarily be performed by temporary workers. Spare trucks and other surplus field equipment were delivered to the storehouses in the New England and Pennsylvania areas. Most of the regular field employees in Pennsylvania were detailed to place assembling cages, baited with attrahent to attract male gypsy moths, in selected locations along all trails and highways at 1/4-mile intervals in a group of townships around the known area of infestation. The cages had all been distributed by July 22, and regular visits to each cage were started immediately. All fences around sprayed areas were carefully examined for damage. Several men were detailed to make observations and records of gypsy moth defoliation in New England. In addition, infestations where burlap bands had been applied to trees were patrolled as often as possible.

Resumption of W. P. A. gypsy moth work after temporary suspension.--Gypsy moth work conducted with W. P. A. funds, which was temporarily suspended on June 30, was resumed in New York on July 17. In Vermont, Massachusetts, Connecticut, and Pennsylvania the work was again taken up on July 20.

Effect of new W. P. A. regulation on gypsy moth work.--The new schedule, which requires 130 hours of work per month by W. P. A. employees, resulted in the reduction of working hours in only one State where Federal gypsy moth work is performed. W. P. A. workers in Vermont had formerly been required to work as many as 138 hours per month. In the other States where W. P. A. gypsy moth work is done, the new schedule added from 2 to 10 hours per month.

Efficiency of tree banding impaired by suspension of W. P. A. work.--The benefit derived from banding trees with burlap strips depends entirely on the frequency and regularity with which the burlaps are turned and the gypsy moth caterpillars and pupae killed. This type of work has been done in the past chiefly by W. P. A. workers or other temporary employees. Because of the lack of such employees after June 30, it was impossible to make either frequent or regular visits to all of the burlapped infestations. Regular field employees made visits to burlapped areas whenever it was possible, but the necessity of performing other types of work during this period interfered greatly with the banding work.

Gypsy moth pupation starts early in July.--Numerous observations made in the field during the first week in July indicated that gypsy moth feeding had nearly ceased in the heavily infested areas east of the barrier zone, particularly in Massachusetts and Connecticut. A high percentage of the caterpillars were spinning up and some had already pupated.

Gypsy moth defoliation observed from autogiro.--An annual survey is made in New England to determine the extent and severity of the gypsy moth infestation in the generally infested area. This work was well under way by July 12, and several of the supervisory employees had completed their survey by July 22; however, in some of the northern sections, particularly in parts of New Hampshire and Maine, this work may not be finished until early in August. In connection with this survey work, an autogiro was piloted over selected areas in Massachusetts and an observer carefully plotted all defoliated sections on topographic maps. The severity of the feeding was also indicated. Several gypsy moth supervisory employees were tried out as observers, while a ground crew traveled by automobile over roads in the same territory and made similar observations. Records will be compared to determine the degree of accuracy with which this type of work can be done by either of these methods.

New gypsy moth infestation found in Connecticut barrier zone.--The discovery of a new gypsy moth infestation in the northwestern portion of the town of Southbury, on the Roxbury town line, was reported by the State Entomologist of Connecticut near the end of June. After viewing the infestation, a regular gypsy moth employee stated that 1 acre of woodland adjacent to the roadside was heavily infested, with 15 to 20 trees defoliated. Some of the caterpillars had pupated, and a large percentage of the remainder had stopped feeding, which made spraying impractical. Several agents were transferred to Southbury to apply burlap bands and crush larvae and pupae found under them or on the trunks of trees within the infested area. During the first week in July these men also crushed moths which had emerged, and creosoted a few newly deposited egg clusters. The town was last scouted with N. R. A. funds in 1934. Based on information obtained to date, the problem of complete eradication of this infestation should not be serious.

W. P. A. gypsy moth workers fight forest fire.--Except for local showers, there has been little relief from the protracted drought that has existed for the last 6 weeks. Several forest fires have been burning in widely separated points in Massachusetts and in eastern New York, and great difficulty has been encountered in fighting them. Most of the mountain streams had dried up, which necessitated the pumping of water from ponds or low-lying bogs through long hose lines to points where knapsack pumpers could be filled and carried to the fire lines. The W. P. A. gypsy moth workers located in Shawangunk, Ulster County, New York, were drafted by the State fire wardens for several successive days to fight a forest fire which by the close of the week ended July 29 had swept over more than 1,000 acres of woodland.

Summary of C. C. C. gypsy moth work during the fiscal year 1939.--The transferring of C. C. C. crews from gypsy moth work to emergency work after the hurricane of September 21 made havoc with the work that had been planned by this Bureau for the fiscal year 1939. At the beginning of the year gypsy moth work was done from 11 different camps located in Massachusetts, Connecticut, and Vermont, but after the hurricane the work was continued from only 2 camps in Massachusetts and 2 in Connecticut, while all C. C. C. gypsy moth work was discontinued in Vermont. The daily average number of enrollees employed on gypsy moth work up to September 21 was 499, but this figure was reduced to 150 from the date of the hurricane to the end of the fiscal year on June 30. A total of over 84,950 6-hour man-days was taken from gypsy moth work and used on emergency work during this period. During the fiscal year 1939, C. C. C. enrollees scouted more than 25,000 woodland acres and 65 miles of roadsides, and approximately 1,600 of these acres received intensive cleaning and thinning treatment. Work was done in 172 gypsy moth colonies located in 36 towns, and more than 8,800,000 new egg clusters were creosoted or destroyed while burning brush and debris. Approximately 53,000 trees were burlapped, resulting in the destruction of over 3,400,000 caterpillars and pupae. The figures for the burlapping work include parts of 2 different larval seasons, as the caterpillar stage overlaps into 2 fiscal years. The egg-cluster and caterpillar data are obtained by actual count at the lighter infestations, and by estimations when the insects are extremely abundant. In addition to this work, about 1,500 acres of woodland in Connecticut was sprayed with lead arsenate.

Defoliation noted by C. C. C. foremen.--Gypsy moth foremen from all of the C. C. C. camps from which gypsy moth work has been done have spent as much time as could be spared to record defoliation in towns within a reasonable distance from the camps concerned, and supervisory officials also made observations when possible. The most severe and extensive defoliation ever recorded in Vermont was noted in the section around Bellows Falls and across the Connecticut River in New Hampshire; while the heaviest defoliations ever noted in those sections were found in Southampton, Mass., and the surrounding towns, and in parts of Granby, Simsbury, Canton, and Barkhamsted, in Connecticut. Lesser defoliation occurred in many other towns. The "wilt disease" was quite prevalent in some locations and has been responsible for the destruction of large numbers of gypsy moth larvae. Imported parasites have also destroyed many of the caterpillars.

Spraying gypsy moth infestation in Connecticut.--The outstanding C. C. C. gypsy moth work for the month of June was the woodland spraying in the heavily infested Granby-Simsbury-Canton area in Connecticut. Approximately 22½ tons of lead arsenate, with fish oil, was used on an area of about 1,523 acres.

Heavy gypsy moth infestations in Massachusetts inspected.--A meeting of members of the Timber Salvage Administration of Massachusetts, the Conservation Department of Massachusetts, and the C. C. C. was held at the Federal Gypsy Moth Office in Greenfield, Mass., and in the field on July 14. The members of this group were given a resume of this project and were shown about the U. S. D. A. buildings in the morning. During the afternoon they examined several large severely defoliated areas in Northfield, Bernardston, Holyoke, Southampton, and adjoining areas. They were shown heavy infestations where no work had been done, and other areas that had been treated and were therefore in much better condition than the surrounding territory, were described to them.

PLANT DISEASE CONTROL

Stem rust caused little damage in 1939.--The season of 1939 has been a very light rust year in general, according to E. C. Stakman, of the Federal rust laboratory, St. Paul, Minn. Winter wheat was damaged very little, on the whole, the aggregate loss not exceeding a trace plus. Spring wheat also was damaged very little, heat and dry weather causing premature ripening of the grain so that the relatively small amount of inoculum distributed in May and June did not have time enough to increase very much. In Minnesota there was only a negligible amount of susceptible spring wheat grown this year. An increase in rust-resistant varieties in South Dakota and North Dakota, together with heat and dry weather, were important in preventing heavy rust development. Rust was a negligible factor on the whole, except for an area in southwestern North Dakota between Dickinson, Mott, and Richardton, where Ceres constituted from 60 to 75 percent of the acreage and where premature ripening due to heat and dry weather was not so pronounced as in most of the other sections of the State.

Survey work progressing in northern Michigan counties.--Crews of laborers have been making progress in intensive survey work in the northwestern part of the Lower Peninsula. Seven of the counties bordering on Lake Michigan, namely, Antrim, Benzie, Charlevoix, Grand Traverse, Leelanau, Manistee, and Emmet, have been considered as having more escaped barberry bushes than any other similar group of counties in the State, according to Francis B. Powers, in charge of barberry-eradication work in that State. The first survey work in these counties was done during the years 1923 to 1926. There are many large orchards in this section and many inland lakes, as well as popular resort sections along the lake shore. Approximately one-sixth of the land in these seven counties is devoted to general farming, rye and oats being the principal crops. Early nurserymen combined the sale of barberries to owners of shore property with the sale of fruit trees to orchard owners, often giving barberry bushes as premiums with purchases of trees and other shrubs. Much of the territory back of the shore line and orchards is heavily wooded or cut-over timber land overgrown with brush. All these factors have combined to make this an ideal location for the spread of barberries by birds and small animals. Deer hunters and trout fishermen have reported common barberry bushes in isolated spots. The crews of laborers working in Leelanau, Benzie, Grand Traverse, and Antrim Counties during 1938 and until the end of June this year have inspected 159 square miles of territory and have destroyed more than 15,400 barberry bushes and seedlings on 194 properties. Most of the bushes eradicated this season were from 2½ to 6 feet high and approximately 7 percent of the larger bushes were bearing fruit.

Blister rust control work in Northeastern States.--Control work during May and June in the Northeastern States resulted in 271,346 acres being cleared of 5,882,640 wild and 7,071 cultivated Ribes bushes. These activities gave 73,406 man-days employment to over 3,000 workers. Over 68 percent of the total acreage examined was in connection with projects carried on under the W. P. A. program. C. C. C. personnel was assigned to Ribes-eradication work from 43 camps during May and 58 camps in June, chiefly in New York and Pennsylvania. Control activities under the C. C. C. program in New England were drastically curtailed this spring, owing to the urgency of projects for reduction of forest-fire hazards in the sections affected by the hurricane of September 1938. In cooperation with the National Park Service and the Forest Service, control work was carried on in Acadia National Park in Maine and in the White Mountain National Forest in Maine and New Hampshire.

Girl scouts eradicate Ribes bushes.--Agent Cramer reports that 15 girl scouts from Camp May Flather at Mount Solon, Va., in the George Washington

National Park, eradicated 141 R. cynosbati bushes. Last year the older girls from this camp helped destroy Ribes plants under the supervision of Agent Cramer, helping to protect from blister rust the forest they were enjoying and fulfilling the Girl Scout precept of returning compensation for benefits received.

Scouting for blister rust in sugar pine region.--Scouting for blister rust has been carried on recently on the Klamath National Forest in places where Ribes infection was prevalent in 1937. Ribes infection was found on the East Fork of Indian Creek at the old infection center located in 1936. On Grider Creek, where there was Ribes infection in 1937, Mr. Lachmund found 1 small sugar pine with 4 incipient cankers, 1 of which had produced pycnia this year. Inspection of the infection center on the East Fork of Indian Creek above Happy Camp showed that infection on pines now extends at least ½ mile down stream and several hundred feet up the slope to the east from the original center. The infection grades out on smaller sugar pines to about 1 tree in 10 infected at the edges of the area. Similar conditions of infection probably occur upstream from the center and up the west slope. The cankers are principally of 1935 and 1936 origin, with a few incipient ones probably of 1937 origin. In view of the enormous increase in the production of aeciospores over that of 1936 and 1937, the infection on Ribes along Indian Creek is not so great as might be expected. It appears that at the time of aeciospore dissemination this year, climatic conditions were not favorable for Ribes infection. No infection on Ribes was observed downstream from the old center for 2 or more miles, although well over 100,000 leaves of R. bracteosum and several thousand of R. sanguineum were examined. Messrs. Lachmund and Crowell are now scouting for the rust on the western slope of the Lassen National Forest in the vicinity of Viola.

Security-wage earners employed on blister rust control.--Plans for the W. P. A. program in the Northeastern States during the period July 1 to September 30 provide for the employment of nearly a thousand security-wage workers on Ribes eradication. Personnel reports received from the field indicate that practically the full quota of men was employed during the latter half of July. In addition, Ribes-eradication work will be performed from about 58 C. C. C. camps from the first of July to the middle or end of September. A State W. P. A. project, employing about 38 men, will be resumed in Connecticut on August 1. In New Hampshire and Maine several towns have appropriated funds for control work and the county of Saratoga, N. Y., is providing $12,000 for this work. In most of the Northeastern States local control work is also being carried on to some extent in cooperation with individual owners.

Ribes infection in Northeastern States.--Exceptionally dry conditions have prevailed throughout the Northeastern States for the last several weeks. At Boston, for example, the total precipitation during July was 0.75 of an inch, as compared to a normal average of 3.49 inches. Notwithstanding the drought, many reports have been received of heavy blister rust infection on Ribes. State Leader Newman of New Hampshire says that the most heavily infected Ribes americanum he has ever observed were recently located on the property of the Manchester Water Board. This species is usually lightly infected. Mr. Calderara also reports heavy infection on such bushes in Saratoga and Warren Counties, N. Y., and further states that all species of Ribes that he has seen this year were heavily infected. State Leader Perry of Massachusetts found *Ribes* heavily infected in Hampshire County.

Blister rust exhibit attracts attention at summer festival.--L. E. Nelson, of the Milwaukee, Wis., blister rust office, reports that an active interest was taken in the blister rust control exhibit at the Milwaukee Midsummer Festival in July. It was estimated that during the 9 days of the festival approximately 150,000 people saw the exhibit. Keen interest was denoted by the number of questions asked by visitors regarding blister rust. Over 12,000 blister rust leaflets were distributed to persons interested in blister rust control.

COTTON INSECT INVESTIGATIONS

Relation of other hosts to thrips on cotton.--E. W. Dunnam and J. C. Clark, Stoneville, Miss., have been giving attention to the species of thrips found on cotton, the relation of other host plants to their abundance, and varietal resistance or tolerance of cotton to thrips. Collections of thrips were made in the spring of 1936 on 40 commercial varieties of cotton and the species determined as *Frankliniella tritici* Fitch, *F. fusca* Hinds, *F. runneri* Morgan, and *Sericothrips variabilis* Beach. In 1937 a population study was undertaken by collecting 20 buds from each of 46 varieties of cotton on June 1 and June 15. The terminal bud samples from each variety were placed in a tightly woven cloth drawstring bag, immersed in gasoline, the thrips counted under binoculars and placed in 70-percent alcohol. This method of making population counts proved very practical but Dudley Moulton, of California, and Floyd Andre, of the Division of Insect Identification, of this Bureau, who made the determinations, stated the specimens were in poor condition and in some cases could not be determined beyond the genera. This suggests that gasoline should not be used and that the 70-percent alcohol used for the preservative should be used for killing these insects. In addition to the 4 species listed above, *F. cephalica* Crawf. and *Thrips tabaci* Lind. were found on cotton in 1937. For the June 1 collection on cotton from the variety field the population ranged from 7 to 55 per 20-bud sample, or an average of 1.5 thrips per terminal bud. Similar samples from cotton growing near an alfalfa field averaged 2.2 thrips per bud and near a fence row covered with perennial sweet peas 14 thrips per bud were found. In the June 15 collection from the same 46 varieties, following a heavy rain, the numbers per sample ranged from 4 to 18, or an average of 0.5 thrips per bud. None of the varieties of cotton were found immune to thrips, although some varieties appeared to be less damaged and fewer terminal buds were killed than in others. A survey was also made to determine what cover crops and other plants were infested with thrips which might later transfer to cotton. Twenty-bud samples were collected and handled similar to the cotton samples. Nine species of plants were found to be infested with one or more of the following species: *F. tritici*, *F. fusca*, *F. cephalica*, *T. tabaci*, and *T.* (Microcephalothrips) *abdominalis* Crawf. The last-named species was not found on cotton and *F. runneri* and *S. variabilis*, which were on cotton, were not found on the other plants examined. *F. tritici*, the most abundant species, was found on flower buds and blooms of the perennial sweet pea, on Austrian pea blooms, hairy vetch blooms, alfalfa buds, *Erigeron* sp. or horseweed, cultivated roses, *Amaranthus* sp., and milkweed. F. fusca was found on Austrian pea blooms and F. cephalica on thorny amaranth. T. tabaci was found on perennial sweet pea flower buds and horseweed. T. abdominalis was found on horseweed. The populations of all species on cover crops and other plants ranged from 1 to 125 thrips per bud or bloom as follows: Perennial sweet pea blooms, 125; hairy vetch, 100; white clover blooms, 13; rose buds, 12; Austrian pea blooms, 8; alfalfa terminal buds, 4; milkweed blooms, 1.5; horseweed terminal buds, 1.5; thorny amaranth, 1.0; and horseweed, 1.0. The thrips damage to young cotton is becoming more serious in the Mississippi Delta as a result of the more extensive use of hairy vetch and Austrian peas as winter cover crops.

Extract from castor bean plant not toxic to boll weevil and cotton stainer.--At Brooksville, Fla., an extract from the castor bean plant is being developed for insecticidal purposes. It is prepared in two forms--liquid and dust. This castor bean extract was reported as "a combination stomach and contact insecticide and as being effective in controlling nearly all of the common citrus pests." To determine if this castor bean extract has any value for use against cotton insects, C. S. Rude, Gainesville, Fla., conducted several tests in June against the boll weevil and the cotton stainer, Dysdercus suturellus (H. S.), using the liquid extract at the rate of ½ pint and 1 pint to 2 gallons of water. This material was found to have no toxic effect on the boll weevil or the cotton stainer and to be of no value as an insecticide for use against these insects.

Effect of burning woods on boll weevil.--Information on the effect of burning over woods on the abundance of boll weevils was reported by F. F. Bondy, Florence, S. C. Weevil counts were made on 4 cotton fields adjacent to burned woods and in 4 adjoining fields adjacent to unburned woods. In 3 counts made at weekly intervals from June 1 to 15, the average for the 4 fields near the burned woods was 48 weevils per acre, and for the 4 fields near the unburned woods 65 weevils per acre. The average square infestation during the latter half of June was 4 percent in the fields near the burned woods and 7 percent in the fields near the unburned woods, and had increased to 47 percent and 60 percent, respectively, by the end of July. The records indicate that the boll weevil infestation near burned woods is less than it is near unburned woods, but the difference is not great enough to warrant the general burning of woods for the destruction of hibernating weevils. Previous investigations have shown that most of the weevils hibernate within 100 feet of the edges of the woods.

Dusting more effective than mopping during presquare stage for boll weevil control.--R. L. McGarr, State College, Miss., reports that on June 9 two small cotton fields were dusted with calcium arsenate and two others were mopped with a mixture of 1 pound of calcium arsenate to 1 gallon of water. Rain washed off most of the poison after about 48 hours. At the time the fields were treated there was a very uniform infestation of weevils in the four treated fields and in the four untreated check fields. The average infestations in these fields 2, 3, and 4 weeks after treatment were as follows:

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Period after treatment (weeks)	Infestation in fields			
	Dusted	Untreated check	Mopped	Untreated check
	Percent	Percent	Percent	Percent
2	6.8	31.0	13.5	19.8
3	16.2	31.2	25.8	30.0
4	10.5	25.8	15.7	19.7

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Situation in the lower Rio Grande Valley.--The area in Texas referred to as the "lower Rio Grande Valley" consists of Cameron, Hidalgo, Starr, and Willacy Counties, and that portion of the valley in Mexico, lying directly across the Rio Grande, is usually referred to as the "Matamoros area." This fertile valley constitutes 1 general cotton-growing area, and was brought under Federal regulation by the 2 countries, United States and Mexico, in 1936 on account of the discovery of pink bollworm infestation. There is a considerable increase in infestation in Cameron County this year, as was indicated early in the season by bloom and boll inspection of the 1939 cotton crop. Gin-trash inspection was begun in the lower Rio Grande Valley district on July 6, and 5,234 pink bollworms had been taken from 1,096 bushels of trash in Cameron County by the end of July, but only a few incipient infestations had been found in the other three lower valley counties. Some fields in Cameron County near the river were heavily infested. Trash from a bale of cotton from 1 of these fields yielded 1,051 specimens of the pink bollworm. A 25-pound sample of seed cotton originating from another heavily infested field was placed in the hot sun for 3 hours and 62 pink bollworms emerged therefrom during that time, indicating that there were at least 2,200 pink bollworms in seed from this bale of cotton. Inspection was completed in Cameron County during July. In the Matamoros area of Mexico, 380 bushels of trash was run for the period, in cooperation with Mexican inspectors, and 7,452 pink bollworms were found, which indicates a decrease in infestation in that district as compared to the 1938 season. At the end of July 56,992 bales of cotton had been ginned in the lower Rio Grande Valley district, this being two-thirds of the estimated 90,000-bale crop for this season. An intensive field clean-up campaign is expected to begin in this district during the first week in August. The sum of $460,000 has been made available for use in an effort to control the pink bollworm in the lower Rio Grande Valley and Coastal Bend districts, the latter area lying directly adjacent to the lower Rio Grande Valley district. It is planned to use such portion of these funds as may be necessary to clean and burn the cotton debris from the most heavily infested area. After deducting the necessary amount to be used in the heavily infested area, the remainder of this fund will be spent in cooperating with farmers in adjacent areas to clean their fields of live cotton plants as required by the State regulations.

Coastal Bend area.--The Coastal Bend district lies directly north of the lower Rio Grande Valley, and is composed of the counties of Brooks, Kleberg, Nueces, Jim Wells, and Kenedy. This area was brought under regulation in 1938 on account of the discovery of a light pink bollworm infestation, which apparently spread from the lower valley district. Three bales of cotton were ginned in the Coastal Bend district during the last 3 days of June, and at the end of July 36,711 bales of cotton had been ginned. Inspection of gin trash was begun in that area about the middle of July to determine whether or not pink bollworm infestation still existed in that area and if so to what extent. At the close of July approximately 3,500 bushels of gin trash had been inspected with negative results. Examination of such material was to be continued through the greater part of August. Sterilization of seed as a continuous process of ginning was not required for that district by the State for the 1939 cotton crop, but this practice was strongly recommended by the Bureau. Considerable opposition was expressed by ginners and oil millers to this procedure on account of the high cost of sterilization machinery, as well as the added moisture to the cottonseed for that particular area, in which it was claimed the seed was already too moist. However, in order to comply with Quarantine 52, ginners found it more convenient to install sterilizers in gins, and definite arrangements were begun early in June to carry out such measures. Concurrent with the controversy regarding installation of sterilizers at gins, efforts were begun in this Division to develop a sterilizer that would overcome objections to installation of sterilizers advanced by ginners and make the regulation imposed less burdensome. As a result, a dry-heat sterilizer was developed that could be built at a moderate price, overcoming the two principal objections to installation of sterilizers in gins, and these machines have proven very successful under actual ginning operations for some time. At the end of July the 71 gins operating in that district had been equipped with sterilizers and were operating as a continuous process of ginning. Thirty-five of these were the new dry-heat machine, the rest being various other models.

Thurberia-plant eradication.--Thurberia-plant eradication, which has been carried on in various mountain ranges in southern Arizona for the last several years through funds provided by the Work Projects Administration, supplemented by funds allotted by this Bureau, was resumed on July 20 after a few weeks' cessation pending allocation of funds for this work. Activities were begun with a crew of 50 laborers, and the first 4 days were utilized in bringing to a close the eradication work which had been in progress for several months in the area south of Continental, in the Santa Cruz Valley. On July 25 work was begun in the Tortillita Mountains. This range was worked in 1935 and 1936 when the eradication of Thurberia plants was first begun, and a rechecking of this territory is considered important in order to determine whether or not plants were missed and to remove any seedlings which have developed during the interval. At the end of July 3,200 acres had been covered and 18 large plants, 122 small plants, 1 stub plant, and 5 seedlings had been located and destroyed. The area being covered in the Tortillitas is exceptionally rough and close search is difficult.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Beet leafhopper abundance in different parts of Intermountain region.--As a result of surveys made by J. R. Douglass and his associates at the Twin Falls, Idaho, laboratory, it has been determined that the abundance of *Eutettix tenellus* (Bak.) in 1939 varies greatly in the different critical areas of the Intermountain region. A survey of beet fields in south-central Idaho made during the first part of June revealed an average of 5.4 *E. tenellus* per 100 feet of beet row, as compared with 24.4 individuals for the corresponding period in 1938. This condition confirms preseason statements issued during the month of May, of probable beet leafhopper populations for this district. A separate survey of the desert breeding areas of southern Idaho and eastern Oregon, made during the period April to June, with the objective of determining the abundance of overwintered beet leafhoppers and the distribution and abundance of spring-breeding host plants, demonstrated that the leafhoppers were not uniformly distributed over these areas but were found concentrated on small patches of susceptible host plants, including green tansymustard, flixweed, and peppergrass. These host plants occurred only sparsely throughout the area and were in poor condition, owing to temperatures above normal combined with deficient precipitation. In general, the beet leafhopper population was very low in southern Idaho, medium in western Idaho, and high in eastern Oregon. A survey of beet fields and overwintering *E. tenellus* in the Nyssa, Oreg., and Toppenish, Wash., districts revealed the presence of overwintered individuals in all fields examined. The infestation per field in the Oregon area ranged from 8 to 24, with an average of approximately 15.6, and in the Washington area it ranged from 3 to 37, with an average of approximately 13.0 per 100 feet of beet row. A survey of the Billings, Mont., area for overwintered beet leafhoppers disclosed the highest carry-over population on record. The infestation extended up the Yellowstone River Valley from Custer to Columbus, a total distance of 96 miles. Incidentally this survey brought forth the fact that Russian-thistle and several species of wild mustard were growing abundantly in the area surveyed. Surveys of beet fields in western Idaho and eastern Oregon late in May to determine the population of the spring generation of *E. tenellus* disclosed an average of 0.66 per beet, which is considered a very low infestation. The presence of fourth- and fifth-instar nymphs in the fields demonstrated that the overwintering adults, which had entered the fields early in the season, had oviposited in the young plants.

Effect of temperature on pyrethrum-oil sprays used against beet leafhopper.--F. H. Harries and J. D. DeCoursey, Twin Falls, report that recent laboratory studies to determine the effects of temperature and humidity on the insecticidal action of pyrethrum-oil sprays against *E. tenellus* demonstrate that temperature exerts an important effect. It was found that the percentages of leafhoppers killed are higher at comparatively low ranges of temperature (60° F.) than at higher temperatures (100°). The accumulated data exhibited a distinct trend toward greater mortality of *E. tenellus* when the insecticide was applied at relatively low humidities, although the differences were not always statistically significant. It was also determined that only a low percentage of *E. tenellus* mortality could be attributed to the presence of spray residue on the treated plants, but that the spray residues present on the interior of the cages exerted an important effect on the mortality of the insects.

Dough balls attractive to wireworms infesting tobacco.--In an experiment conducted by J. U. Gilmore, W. A. Shands, and J. T. Connor, of the Oxford, N. C., laboratory, to determine the relative attractiveness to wireworm larvae of several materials, including diced Irish potatoes and dough balls made of wheat middlings, wheat flour, and fine wheat bran, it was found that the dough balls of the wheat products attracted far more wireworms at the end of 1 week than did the potatoes and that a higher percentage of the dough-ball samples were infested. The same relationship existed at the end of 2 weeks, but it was less pronounced. Apparently many of the larvae that had been attracted to the dough balls during the first week deserted them by the end of the second week. Potatoes showed a slightly higher infestation and higher percentage of infested samples at the end of 2 weeks in the soil. Basing the intensity of larval concentration to the dough balls on the larval population found in a nearby plot, the average increase in wireworm population in a circular area of 1/4 square foot and 6 inches deep, centered around each buried dough ball, were 329, 341, and 300 percent for wheat middlings, wheat flour, and fine wheat bran, respectively, whereas potatoes showed an increase of 60 percent. The wireworms involved in these studies consisted principally of two species, tentatively identified as Conoderus vespertinus (F.) and C. lividus (Deg.), which were causing injury to newly set tobacco plants.

Dichloroethyl ether gives promising results against raspberry root borer.--W. W. Baker and B. J. Landis, of the Puyallup, Wash., laboratory, have obtained promising results in the use of dichloroethyl ether in combating the raspberry root borer (Bembecia marginata (Harr.)), when directed against this insect in its winter hibernaculum in bush blackberries. The dichloroethyl ether has given better results than any other material experimented with, including various combinations of oil and nicotine. Best results were obtained by plowing up the soil around the bases of the plants to heights of 5 or 6 inches above the general soil level in order to retain the dichloroethyl ether in close proximity to the hibernacula for a sufficient duration of time to allow the penetration of the dichloroethyl ether through the covers of the hibernacula. The applications were made during the period between November 1 and March 1, as the B. marginata larvae ordinarily begin to come out of hibernation and start attacking the new buds of the host brambles approximately the middle of March. The dichloroethyl ether was used at the dilution of 15 cc. per gallon of water, and thus far no detrimental effects to bush blackberries from this treatment have been noted. Two different types of conditioning agents were used with the dichloroethyl ether. One of these consisted of a spreader and penetrant, while propylene glycol was also used in some of the tests because of its compatibility with dichloroethyl ether and because of its penetrating character. It is apparent that these conditioning agents assisted in getting the material in contact with the B. marginata larvae.

Corn meal and zinc phosphide effective against mole cricket.--As a result of recent laboratory tests with various poisoned baits against Scapteriscus spp., J. N. Tenhet, of the Sanford, Fla., laboratory, reports that corn meal and zinc phosphide moistened with water was the most satisfactory of any of the baits tested. Combinations of wheat bran, corn meal, oatmeal, dried blood, and sheep manure, with zinc phosphide, sodium fluosilicate, cryolite, and tartar emetic were tested both when moistened with water and when moistened with a highly refined mineral oil. The general conclusions drawn from this experiment, other than that mentioned above, were that poisoned baits moistened with water were more attractive than and equally as effective as baits moistened with oil. Sodium fluosilicate baits were second in effectiveness to the zinc phosphide baits, but were much less attractive. Cryolite and tartar emetic gave unsatisfactory results as poisons against mole crickets, while dried blood and sheep manure were not satisfactory as foods.

Nicotine-hydrated lime dust mixture more effective against cabbage aphid than dust mixtures containing rotenone with various conditioners.--N. F. Howard and R. H. Nelson, of the Columbus, Ohio, laboratory, report that results of field tests against *Brevicoryne brassicae* (L.) in southern Ohio indicate that a nicotine-hydrated lime dust mixture containing 2.4 percent of nicotine is much more toxic to this species of aphid than dust mixtures containing 1 percent of rotenone derived from cube and containing either sodium oleyl sulphate or peanut oil as conditioners, with talc as the diluent, or a cube-dust mixture composed of equal parts of finely ground dusting sulfur and tobacco dust. Although the final data from the plots where cube-dust mixtures were applied indicated a slight degree of reduction of aphid populations in the treated plots, as compared to similar untreated plots, it appeared that none of the dust mixtures containing cube gave satisfactory control of the aphid. Good control was obtained, however, by the application of dust mixtures of nicotine with hydrated lime.

FOREIGN PLANT QUARANTINES

Mediterranean fruitfly intercepted in packing material.--A customs examiner at the port of Baltimore, Md., while inspecting a small registered-mail package containing green coffee, ground coffee in vials, and 32 green coffee berries from Brazil, addressed to a local consignee, noticed an adult fly and a pupa in some medicated cotton used as packing material. The living adult had apparently emerged in transit and was found in a corner of the box entangled in the cotton. Both the adult and pupa were identified as *Ceratitis capitata* Wied.

Large numbers of Mexican fruitfly arriving at border ports.--On June 15 an American boxcar arrived in the Juarez yards of the National Railways of Mexico loaded with mangoes in bulk. Approximately 700 larvae of *Anastrepha ludens* Loew were taken from this car of mangoes. An empty boxcar recently inspected in the railway yards at Nuevo Laredo contained a few discarded mangoes. When this car was cleaned an examination was made of the fruit and approximately 50 percent contained anywhere from 1 to 12 larvae of this fruitfly.

Prohibited plant material from Jamaica.--On May 3, a passenger arrived at New York on the S.S. *Jamaica* from Kingston, Jamaica. The baggage declaration prepared by this passenger listed nothing of plant-quarantine interest. The customs inspector assigned to the inspection of this individual's baggage had his suspicions aroused by the small capacity of a certain trunk. A close examination revealed that this trunk had a false bottom under which were found 18 nodes of sugarcane, 6 mangoes, 3 yams, 1 pound of banana leaves, and some restricted plant material consisting of 1 cacao bean pod, 12 coconuts without the husks, 12 plantains, 10 yautias, 1 pound ginger root, and 1 pound shelled corn.

Pink bollworm intercepted in baggage from Sicily.--On July 20 six cotton bolls were taken from the baggage of a passenger arriving on the

S.S. *Rex*. Two living larvae of the pink bollworm were found in cotton seeds taken from these bolls. The passenger stated definitely that the origin of the cotton seeds was Sicily.

Citrus canker with U. S. oranges.--Citrus canker was found on one of five Japanese oranges mixed with about a hundred of United States origin in the stores of a Norwegian vessel at Seattle on July 5. This is another incident proving that the old saying, "Things are not always what they seem," is still applicable in inspection work. Incidentally only four interceptions of citrus canker were made during the fiscal year 1939, apparently the lowest record for 10 years or more.

Entomological interceptions of interest.--Twenty-five living larvae of the trypetid *Anastrepha* sp. were intercepted at New Orleans on March 20 in one fruit of *Passiflora* sp. in passenger's quarters from Costa Rica. Six living larvae of the melon fly (*Dacus cucurbitae* Coq.) were intercepted at San Francisco on April 17 in a cucumber in ship's stores from Hawaii. Two living larvae of the West Indian sweetpotato weevil (*Euscepes postfasciatus* Fairm.) were taken at Boston on April 6 in yams in baggage from Jamaica. Five living specimens of the cydnid *Allocoris incognita* McA. & M. arrived at Brownsville, Tex., on March 28 on snapdragons in baggage from Mexico. Specimens of the scale insect *Chrysomphalus paulistus* (Hempel) were intercepted at New York on March 29 on a grape berry in cargo from Argentina. A living larva of the weevil *Brachyrhinus rugosostriatus* (Goeze) was found at Seattle, Wash., on March 23 with soil around the roots of rhododendron in cargo from Canada. A living specimen of the pentatomid *Platycarenus humilis* (H. S.) was taken at Galveston, Tex., on April 3 with banana debris in cargo from Mexico. Four living larvae of the pink bollworm (*Pectinophora gossypiella* Saund.) arrived at New York on April 19 in cottonseed in the mail from Jamaica. A living adult of the chrysomelid *Platycycla deruta* (Boh.) was intercepted at Laredo, Tex., on April 29 on a banana in cargo from Mexico. A living specimen of the lygaeid *Nysius monticola* Dist. was taken at El Paso, Tex., on February 20 on cabbage in baggage from Mexico. Living specimens of the scale insect *Aspidiotus herculeanus* D. & H. were collected on March 7 on *Phoradendron randiae* in the field at Arecibo, P. R. Living adults of the chrysomelids *Aphthona ovata* Foud. and *Lema cyanella* (L.) were intercepted at Washington, D. C., on March 13 with forest litter used as packing for shrubs in the mail from Poland.

Pathological interceptions of interest.--*Botrytis allii* M. T.Munn was found on onion bulbs from Finland on March 9 at New York. *Clithris quercina* (Pers.) Rehm. was intercepted on April 20 at Washington, D. C., on oaks from Germany. *Coryneum* sp., no species reported on host, was found on leaves of *Pyracantha* sp. in cargo from Canada on March 29 at Seattle. *Diatrypella* sp., no species reported on host, was found on February 17 on *Polyscias guilfoylei* from Bermuda at New York. A badly spotted lemon from Italy taken at New York on July 20 was found to have a fungus developing on the spots and producing tiny two-celled dark spores of the *Diplodia* type. *Heterodera marioni* (Cornu) Goodey was intercepted at San Francisco on June 30 in *Mammillaria bombycina*, *Gymnocalcium denudatum*, and *G. platense* from Japan and on July 14 in *Sedum* sp. from Costa Rica. *Phoma russeliae* Trav. & Spessa was intercepted on November 10, 1938, at New York on a plant of *Russelia equiseti* in baggage from Syria. *Phyllosticta saccardoi* Thum. was intercepted on rhododendron plants in cargo from Germany on

March 29 at New York. *Physalospora pandani* E. & E. was found on a *Pandanus* sp. plant in baggage from Bermuda on March 6 at New York. *Pleospora* sp., no species reported on host, was intercepted on one of the leaves of *Pyracantha* sp. in cargo from Canada on March 29 at Seattle. *Pucciniastrum myrtilli* (Schum.) Arthur was intercepted on rhododendron plants in baggage from Canada on June 26 at Seattle. Arthur's manual does not list this rust on any species of Ericaceae in western North America. *Sclerotium* sp., with sclerotia unlike those of *S. gladioli* Massey, was found on a gladiolus corm in a lot of 50 in baggage from Holland on December 15, 1938, at New York. *Septoria lepidii* Desm. was intercepted on leaves of *Lepidium campestre* on July 14, 1938, at Chicago in mail from the Union of Soviet Socialist Republics.

DOMESTIC PLANT QUARANTINES

Grasshopper control reaches peak early in July.--The early maturity of grasshoppers brought on the high point of control operations, particularly against migratory forms, earlier than usual. This resulted in a peak of effort to control the hoppers before winged migrations developed.

Grasshopper control in the long-winged migratory area.--In the contiguous parts of Colorado, Kansas, New Mexico, Oklahoma, and Texas, where heavy infestations of *Dissosteira longipennis* Thos. had prevailed, control operations were so effectively carried out that they were largely completed by mid-July. Populations were so depleted over most of the area by that time that not more than two or three grasshoppers per square yard could be found. Baiting crews were discontinued and plans made to rebait, at a later date, areas where straggling hoppers of this species would congregate for egg laying. Flights of this species have been rare. Minor flights developed from rough and inaccessible areas on the border of Colorado and New Mexico. Late in July and early in August baiting of egg-bed congregations of *D. longipennis* was in progress in Colorado, New Mexico, and Texas.

Grasshopper control in the lesser migratory area.--Early in July most of *Melanoplus mexicanus* Sauss. had reached the adult stage and egg laying had begun in the southern half of its range. Dispersing flights developed with depletion of populations on idle, abandoned, and range land to such a degree that further baiting thereon was unwarranted. The Federal idle-land baiting crews were assigned for a short period to assist farmers in protecting crops, on which migrant hoppers had settled, until harvesting halted baiting by farmers. No mass, long-distance migrations occurred and no extensive crop damage has been done. In limited areas relatively heavy damage has occurred, but these areas are negligible as compared to the vast acreage of crops protected. Some baiting is expected after harvest for the protection of row and late-forage crops.

Grasshopper survey planned.--Late in July a conference of general supervisors was called to develop plans for the adult and egg surveys. The adult survey was started early in August.

Mormon cricket control activities slacken.--Control operations against Mormon crickets, which started earlier than usual in the 11 Rocky Mountain and northern Great Plains States and reached a peak at mid-June, drew rapidly to a close in July because of slackening of migrations and scattering of crickets. With the exception of several counties in Idaho, Nebraska, Nevada, Oregon, and Wyoming, where control was still being conducted intensively on a small scale, field control was completed by the end of July. Small crews of workers were continued to dismantle and roll metal barrier and to clean dusters for winter storage.

Mormon cricket adult and egg survey.--With the termination of control work, supervisors were turning their attention to the adult and egg survey, upon the results of which will depend the estimated needs for control work in 1940. As usual, decided variation exists as to the proper season for surveys, particularly on account of land elevations.

Range damage by Mormon crickets.--The extensive acreage of infested land has necessitated restriction of Mormon cricket control activities to crop protection. Considerable damage is reported this season on range land in Clark and Owyhee Counties, Idaho, and in Baker County, Oreg. In the last-named county, Division of Grazing representatives estimate destruction of 1 ton of range forage per acre on 250,000 acres of range.

Natural enemies of Mormon cricket adults and eggs.--Among those observed preying on adults and digging up cricket eggs were the American magpie, Mexican raven, chicken hawk, porcupine, blackbird, red-shouldered hawk, red-tailed hawk, squirrel, chipmunk, ground squirrel, marmot, curlew, catfish (where crickets were crossing the Missouri River, Mont.), horned lark, western meadowlark, mourning dove, field mice and rats, pinyon jay, western robin, California gull, and vesper sparrow. Palmodes laeviventris Cress. became increasingly more abundant in various districts of the region.

White-fringed beetle control at peak.--The high point of control work against this insect continued through July and into the early part of August. Adult emergence extended through this period, failing to occur in "peak" form as in 1938, apparently because of climatic conditions. Tapering off of control work has permitted release of some personnel to survey operations in and near known infestations.

Spraying and dusting for white-fringed beetle control.--Spraying with herbicide of railway rights-of-way, waste land, and other places has attracted the attention of public and railway officials to the possible use of this inexpensive material for weed killing on highways, railways, and for sanitation purposes. More than 1,200 miles of trackage in addition to other areas have been denuded of vegetation to kill beetles and destroy food plants. Excessive almost daily rains during the period, exceeding 20 inches at Florala in July, have necessitated such frequent applications of calcium arsenate and cryolite dust that local wags at New Orleans and Florala have dubbed those areas "the dust bowl." Nevertheless, except in limited areas cropped to legumes on which calcium arsenate is impractical, the outstanding feature of the control program has been the very satisfactory population suppression, extending in some areas of high populations to 99-percent control, as indicated by field observations.

Slight extension of white-fringed beetle infested area.--The lightly infested area at Pensacola, Fla., was extended early in August along the railway tracks about 1/2 mile, involving an area of about 10 city blocks.

Infestation in this new area did not exceed 8 beetles per acre and connects an outlying isolated area to the main infestation. Immediate intensive control operations were directed at the new area.

Modification of white-fringed beetle quarantine restrictions.--The third revision of B. E. P. Q. 485, effective July 28, 1939, extends the period of exemption from certification to February 1, 1940, of several restricted commodities when consigned from Saint Bernard Parish, La.

Sweetpotato weevil inspections in western Texas and New Mexico.--In accord with plans for 1939 inspection, the area around El Paso and contiguous portions of New Mexico near Las Cruces, in the Mesilla Valley, were inspected and no weevils were found. In the El Paso Valley, where plans are being made for increased acreage, 30 inspections were made between El Paso and Fabens. Principal growing points are now at Ysleta and San Elizario.

Peach mosaic and phony peach inspections.--Having completed inspections of nurseries and budwood sources and their environs by the end of June, attention was directed to inspection and removal of diseased trees from orchards in July. During the latter month orchard inspection was completed for the season in Colorado, Illinois, Maryland, New Mexico, North Carolina, Pennsylvania, and Utah. Inspection is being continued in the other phony peach infected States and in California. In the last-named State, inspectors are finding a large number of newly infected mosaic trees in orchards where diseased trees have not been previously removed; whereas, in areas where diseased trees have been removed on discovery, recurring infections are relatively slight. One mosaic-infected tree was found in Hopkins County, Tex., and was immediately removed. Inspection of previously infected and adjacent properties in Illinois, Maryland, and Pennsylvania revealed but two phony-infected trees on a previously infected property in Marion County, Ill. No infection was discovered in Illinois in 1937 or 1938.

Citrus canker eradication.--No citrus canker infections were discovered in July. Inspection work has been concentrated during the month in Harris County, from Houston to the county's east boundary. On 427 properties were found 40,566 citrus trees, of which 39,308 were destroyed. Along Clear Lake, which is bounded by ranches, one of which is known as the West ranch, consisting of several thousand acres, now a game preserve, have been found several old house sites surrounded by *Citrus trifoliata*. The greater part of this ranch has been strip-worked. Regular inspectors will shortly be assigned to inspect properties in Houston, where little previous work has been done.

Eastern drought restricts movement of quarantined products.--Transit inspectors report shipments of materials restricted by Federal domestic quarantines have been unusually light through most inspection points during July. Apparently dry weather in the East is restricting the usual movement of produce and plant material from that area.

Transit inspectors foster volunteer aid.--The importance of the good will of the Post Office Department personnel and the carriers is exemplified by the recent finding and reporting at Pittsburgh by alert Railway Mail Service clerks of 2 adult Japanese beetles in through-mail sacks. One live beetle was found in a sack from the Pennsylvania Terminal at New York and 1 crushed beetle from a sack loaded at Philadelphia. Reporting of air mail shipments at Chicago, Kansas City, and St. Louis resulted in inspection of 40 shipments of plant material.

INSECTICIDE INVESTIGATIONS

Removal of phenothiazine spray residues from apples.--C. W. Murray, of this Division, and A. L. Ryall, of the Bureau of Plant Industry, both stationed at Yakima, Wash., have recently reported (Indus. Engin. Chem., News Ed., v. 17, No. 12, p. 407, June 20, 1939) that phenothiazine spray residues on apples in amounts up to 0.06 grain per pound may be readily reduced to 0.01 grain per pound or less with present washing equipment and solutions. Although phenothiazine spray residue on apples or other fruits or vegetables is not regarded as deleterious to health, such residues may be unsightly and it may be desirable to remove them. An account of these tests is given.

Comparison of rotenone methods.--S. I. Gertler is carrying on collaborative work on several species of rotenone-bearing plants. The purpose is to compare results obtained in the analysis of samples by the crystallization method with alcohol purification as published by Cahn and Boam (Jour. Soc. Chem. Indus. 54(8):37T-42T, Feb. 22, 1935), with the Jones titration method as published in Industrial and Engineering Chemistry (Analyt. Ed., v. 10, No. 1, p. 684, Dec. 15, 1938). In each case room temperature extraction with chloroform is used in conjunction with decolorizing carbon.

Chemical study of commercial geraniol.--Variations in attractiveness for the Japanese beetle of commercial grades of geraniol have led to a renewed study of these baits. The grade of geraniol used contains only about 50 percent of the alcohol, geraniol, the remainder consisting largely of citronellol, other alcohols, and esters. Chemical and physical fractionations of samples of the commercial material are being undertaken by H. L. Haller and H. A. Jones in an effort to determine the constituents most attractive to the beetle. Certain fractions already prepared have been tested this past season at Moorestown, N. J., by the Division of Fruit Insect Investigations. R. D. Chisholm, in charge of the chemical investigations relating to Japanese beetle control at Moorestown, is studying the decomposition of these materials and means of preventing it by the use of antioxidants. It is also hoped that this work will lead to the setting up of better specifications for baits attractive to the beetle.

Increasing solubility of rotenone in petroleum oils.--A serious drawback to the use of rotenone in sprays where a hydrocarbon oil is used as a solvent is the low solubility of this compound in the oil. A method for increasing the solubility of rotenone from 0.01 g. to 0.25 g. in 100 cc. of a hydrocarbon such as "Deobase" has been developed by H. L. Haller and L. E. Smith. This process should result in the use of higher concentrations of rotenone in commercial fly sprays. A public service patent application, which covers the process employed, is pending.

Amur cork tree--a new insecticide.--Recently a preliminary examination disclosed that the fruit of the amur cork tree (*Phellodendron* spp.), a tree that possesses interest in connection with soil-erosion problems, possessed insecticidal properties. Extractives of the fruit were found to be highly toxic to mosquito larvae, codling moth larvae, and the house fly. A chemical examination of the extractives has now been undertaken.

New apparatus for particle-size measurements.--The many entomologists who are taking an ever-increasing interest in the relation between particle fineness and insecticidal efficacy, in powders for dusting and spraying, will welcome the appearance of a new apparatus designed by E. L. Gooden, physicist in the Division of Insecticide Investigations. This device indicates directly the average particle diameter of a powder, without the necessity for a size-distribution analysis, any sedimentation experiments, or any microscopic measurements. No calculations are required, provided the approximate density of the material is known in advance. Problems of solubility do not enter, as they do in sedimentation, and the sample is not consumed or altered in the experiment, but may be used later for other work. The principle on which the instrument works is that a current of air flows more readily through a bed of coarse powder than through an otherwise equal bed of fine powder. Final tests on the accuracy of the results given by the apparatus are almost completed.

Toxicity of chlorophenols.--In a continuation of studies of the toxicity of phenols to goldfish, the three isomeric monochlorophenols were prepared and tested by W. A. Gersdorff and L. E. Smith with respect to concentration and survival time, and the results were compared with each other and with those for phenol. The introduction of chlorine into the phenol molecule results in a markedly different mode of toxic action from that of phenol. According to the minimal product of the concentration and survival time which is a measure of toxicity in its range of most powerful action the relative toxicity of the three isomeric chlorophenols as compared with phenol (=1) is as follows: ortho-, 1.15; meta-, 1.51; para-, 1.89. Details of this work are the subject matter of a manuscript which has been submitted for publication.

BEE CULTURE

Colony collects 40 pounds of pollen in 1 year.--There have been many estimates as to the amount of pollen carried in by a colony in 1 year. Frank E. Todd, of the Pacific States Bee Culture Laboratory, by means of pollen traps at the entrance of a hive has made actual determinations of the amounts carried in by a colony during 2-week periods throughout the entire year. He has presented the following data for the 12-month period beginning June 16, 1935.

Period		Total pollen	Period		Total pollen
	1938	Grams		1939	Grams
June	16-30	316	January	1-15	0
July	1-15	570		16-31	(Trace)
	16-31	1,293	February	1-15	13
August	1-15	845		16-28	735
	16-31	832	March	1-15	1,603
September	1-15	804		16-31	2,889
	16-30	523	April	1-15	2,957
October	1-15	345		16-30	2,168
	16-31	218	May	1-15	984
November	1-15	65		16-31	582
	16-30	0	June	1-15	165
December	1-15	0			
	16-31	0	Total for 12 months		17,907 (39.47 lbs.)

A correlation of the brood-rearing cycle of the colony with its daily pollen income was evident. Furthermore, the data support the general observation that most of the pollen comes in during the morning.

Alfalfa in Imperial Valley supplies pollen freely.--In previous work alfalfa was not observed to supply pollen to the honeybee in abundance. Studies in the last few months by Geo. H. Vansell, of the Pacific States Bee Culture Laboratory, indicate that this is not the case in all localities. In a recent report on these studies he states: "The pollen situation in alfalfa in the Imperial Valley was radically different from that observed by me anywhere else in California, Oregon, Nevada, or Idaho, where alfalfa seemed to be a meager pollen source. This plant was providing pollen for the bees at times rather freely in Imperial Valley. Very clearly, wind was a serious handicap in working alfalfa for pollen and nectar. During the height of the first duststorm, bees were not present on any plant and it was during this time that many of the colony observations were taken. Bees worked alfalfa for pollen especially in the morning, but a few bees collected pollen throughout the day. The method of collecting pollen from alfalfa is not clear to me, because numerous bees were working untripped blossoms apparently for pollen. It seems impossible that they could obtain pollen without tripping. In the case of such bees the shorter mouth parts and the whole posterior ventral part of the head, and the anterior ventral part of the thorax were completely covered with a mass of pollen. This, in connection with the appearance of the bees when working the blossoms, indicated that they were reaching in with the mouth parts exclusive of the tongue, taking out the pollen after which it was transferred in the usual way. The bees worked alfalfa for nectar in the characteristic fashion. In some instances they would scramble over the top of the blossom reaching in with the tongue, in other cases they would work from the side in some manner thrusting in the tongue. Alfalfa was providing a tremendous amount of nectar during our visit. Bees were working it daily except during the high periods of wind. Many of the hives were full, needing more room for ripening; however, ripening in the Imperial Valley may not be a very serious undertaking, considering the high temperatures and low humidity."

Scale insect on white fir produces honeydew copiously.--Mr. Vansell also reports: "A large scale insect, resembling a lecanium, on white fir (*Abies concolor*) is producing a copious supply of water-white honeydew at the 5,300 feet elevation in Eldorado County, Calif. The insect has been tentatively identified by G. F. Ferris, of Stanford University, as belonging to the genus *Physokermes*. Prior to this observation the source of the fir honey was thought to come from aphid insects."

IDENTIFICATION AND CLASSIFICATION OF INSECTS

A new American record for European bruchid.--The European broom bruchid (*Bruchidius villosus* (F.)), established in Massachusetts for some 20 years, was received for identification in June emerging from the seeds of common broom (*Cytisus scoparius*) taken at Monticello, the estate of Thomas Jefferson, near Charlottesville, Va. It is uncertain whether this is an extension of the former colony or represents a separate introduction into Virginia. The common broom and its allies have been much planted as ornamentals in this country and the broom has become established in several Atlantic States in limited colonies, but on the Pacific coast, from Vancouver Island to San Francisco, it is rapidly expanding its range and occupying large areas of the coast, which resembles its European home in climate. *Bruchidius villosus*, however, is not known to be established anywhere on this continent except in Massachusetts and Virginia. This insect has no great economic significance, as it affects only close allies of the broom, species of *Cytisus*, *Laburnum*, *Spartium*, *Calycotome*, and *Genista*, and does not reinfest seeds in storage.

A valuable addition to the collection of Diptera.--From H. Schmitz, S. J., of Ignatius College, Valkenburg, Holland, C. T. Greene has received for the National Collection 67 named species of Phoridae and Termitoxeniidae, 54 of which are new to the collection. The family Termitoxeniidae has hitherto been unrepresented in the National Collection. It is of special interest because its species are guests in nests of termites in Java, are wingless, and quite unlike other flies in appearance. Three of the species received (representing 3 genera) are of this family.

Two tropical species of leafhoppers found in the United States.--Recent collecting in Florida by P. W. Oman has brought to light interesting records of the occurrence of two tropical leafhoppers in the United States. *Agallia albidula* Uhl., a common species in the West Indies and northern South America, and previously recorded from the United States only from Mount Desert Island, Maine, was taken at La Belle, Fla. At the same locality *Typhlocybella minima* Baker was found in abundance. This species, originally described from Nicaragua, and common throughout Central America, northern South America, and the West Indies, was not previously known to occur in the United States.

Ctenothrips bridwelli Franklin recorded as a lily pest.--*Ctenothrips bridwelli* was described by Franklin (Ent. News *18*: 247-250, figs.) from specimens collected near Dover, N. H., on *Symplocarpus foetidus* (skunk cabbage), on April 11, 1904. Since that time this thrips has been found in various localities in the eastern United States, chiefly on the above plant and on Trillium. On July 22, some specimens of Thysanoptera were received for determination from E. P. Imle, of the Boyce Thompson Institute for Plant Research. They had been collected on lily foliage and on examination were found by Floyd Andre to be adults and nymphs of Ctenothrips bridwelli Franklin. Mr. Imle wrote on August 9, forwarding a statement of his experience with this species. It was first observed by him at Charlotte, Vt., on June 7, 1939, on a border planting of about 100 plants of Lilium umbellatum which were all infested. The stems and under portions of the leaves of the lower third of the plants showed numerous feeding marks. The lower leaves were turning yellow in many instances. Numerous nymphs were present but no adults were observed. The same garden was visited again on July 25, by which date the damage had increased to the point where most of the leaves on the lower half of the plants were dried and brown. By then most of the nymphs had transformed to adults so that the immature stages were difficult to find. Mr. Imle found the same species of thrips on several occasions this season on Lilium speciosum, L. formosanum, L. canadense, L. superbum, L. henryi, and L. regale in a garden at Bronxville, N. Y., where it was causing noticeable injury. A small infestation was also noted on L. regale and L. tigrinum on July 26 at Manchester, Vt. In addition to its potential importance as an economic pest of lilies, Ctenothrips bridwelli is considered of significance as a possible vector of the destructive virus disease of lilies.

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